Purpose:

Challenge students to move beyond simple calculations with equations. At this point in their preparation, they need to use reasoning to frame the question and subsequently apply appropriate equations.

Goal:

Demonstrate ability to compare potential breeding methods using the theoretical Genetic Gain, i.e., breeder's equation.

ALA: Response to Selection and Genetic Gain

Imagine that you are responsible for developing varieties for a self-pollinated crop. One of your colleagues has suggested that early generation testing, i.e., testing F_2 derived lines, will accelerate genetic gains relative to the traditional testing of F_5 derived lines because it will require one less year to complete a cycle. The two proposed breeding strategies are depicted in the following figure:

Early Generation Test

Season 1:	*E x I*
Season 2:	F_1
Wet Season:	F_2
Season 1:	$F_{2:3}$
Season 2:	$F_{2:4}$
Wet Season:	*Eval* $F_{2:5}$

Traditional Test

Season 1:	*E x I*
Season 2:	F_1
Wet Season:	F_2
Season 1:	F_3
Season 2:	F_4
Wet Season:	F_5
Season 1:	$F_{5:6}$
Season 2:	$F_{5:7}$
Wet Season:	*Eval* $F_{5:8}$

Translate the proposal into a testable hypothesis in which response to selection is evaluated on the basis of cost per unit gain and test the colleague's hypothesis.

Constraints: The available resources in terms of nursery plots and field plots per season will be the same for each method. It is reasonable to assume that selection intensity will be the same because the number of plots will be the same for both nurseries and field testing. Cost per field plot is $25. Cost per nursery plot used to advance generations is $2.